

## Installation, Start-Up and Service Instructions

### SAFETY CONSIDERATIONS

Installing and servicing air conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install or service air conditioning equipment.

Untrained personnel can perform basic maintenance, such as cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in literature and on tags and labels attached to unit.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions *thoroughly*. Consult local building codes and NEC (National Electrical Code) for special installation requirements.

### ⚠ WARNING

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Electrical shock can cause personal injury.

### INSTALLATION

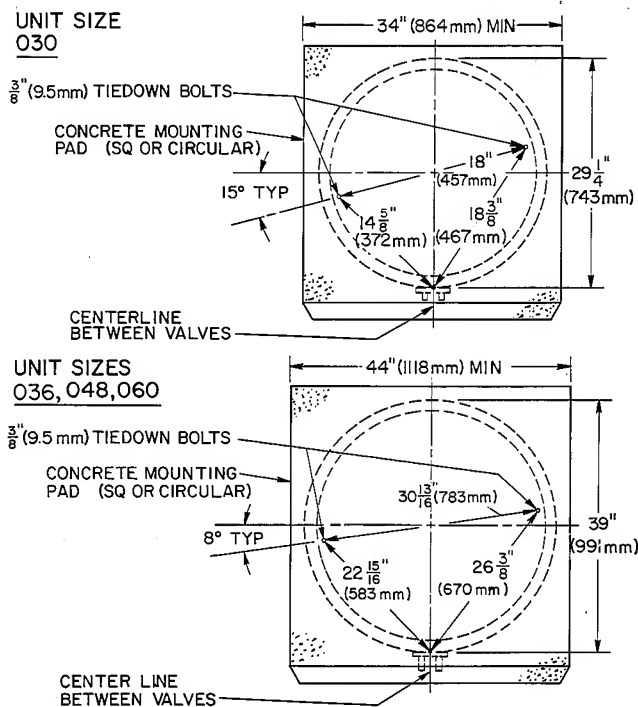
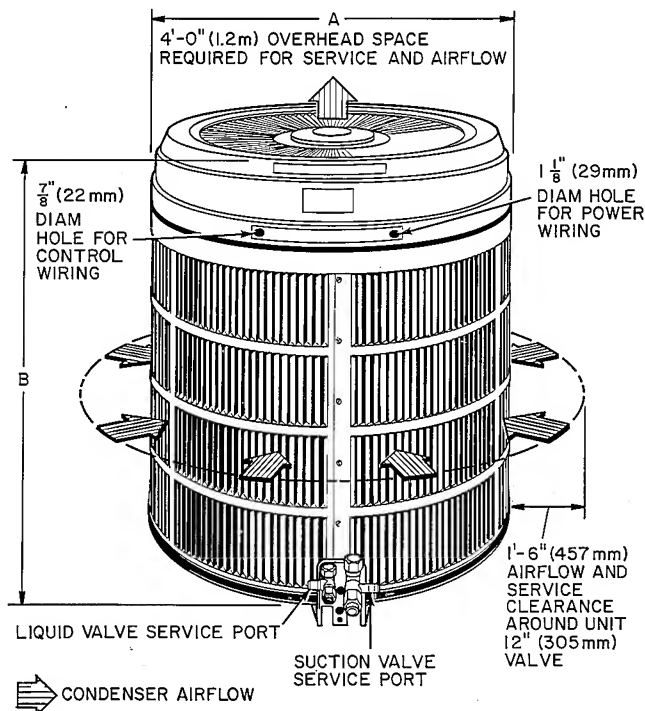
**Step 1 — Install on a Solid, Level Mounting Pad** — It is recommended that unit be attached to pad using tiedown bolts. Fasten unit to pad using holes provided in unit base. See Fig. 1.

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping and service. Maintain a minimum of 1.2 m (4 ft) clearance from obstructions above and 457 mm (18 in.) around unit (305 mm [12 in.] on valve side). Maintain a distance of 610 mm (24 in.) between condensing units. Position so water or ice from roof or eaves cannot fall directly on unit.

**Step 2 — Replace Indoor AccuRater Piston if Required** — Check indoor coil piston to see if it matches the required piston listed in Table 2. If it does not match, replace indoor coil piston with piston shipped with this outdoor unit (located in plastic bag taped to valves). See Fig. 2.

*When indoor coil is more than 2 sizes larger than outdoor unit (i.e., 38EC030/28--042 or 40--042), remove AccuRater and use a bleed-type TXV (thermostatic expansion valve) for refrigerant control. Size TXV to nominal capacity of outdoor unit.*

**Step 3 — Make Piping Connections** — Outdoor units may be connected to indoor sections using Carrier accessory tubing package or field-supplied tubing of refrigerant grade, correct size (see Table 1) and condition. For tubing requirements beyond 15 m (50 ft), obtain information from your local distributor.



Certified dimension drawings are available upon request.

**Fig. 1 — Dimensions, Connections and Mounting Pad (Refer to Table 1)**

**OUTDOOR UNITS CONNECTED TO CARRIER-APPROVED INDOOR UNITS** — Outdoor units contain correct system refrigerant charge for operation with indoor unit of the same size when connected by 7.6 m (25 ft) of field-supplied or Carrier accessory tubing. Check refrigerant charge for maximum efficiency (see Refrigerant Charging).

### ⚠ CAUTION

**DO NOT BURY MORE THAN 914 MM (3 FT) OF REFRIGERANT TUBING IN GROUND.** If any section of tubing is buried, there must be a 152-mm (6-in.) vertical rise to the valve connections on the outdoor unit. If more than the recommended length is buried, refrigerant may migrate to cooler buried section during extended periods of unit shutdown, causing refrigerant slugging and possibly compressor damage at start-up.

**CONNECT REFRIGERANT LINES** to fittings on outdoor unit suction and liquid service valves (Fig. 1). Unit Compatible Fittings permit mechanical (quick-connect) or sweat connections.

Compatible Fitting on outdoor section has aluminum plugs located beneath compatible nut — one plug each on suction and liquid valves. Plugs keep contaminants out of Compatible Fitting.

### ⚠ CAUTION

When removing compatible nut, be careful pressure build-up does not cause aluminum plug(s) to blow and cause injury. After tubing is hooked up, discard plug(s).

**Models 38EC030,036,048,060** — When using 29 mm (1-1/8 in.) field-supplied refrigerant suction line, sweat-connect suction line to 29 mm (1-1/8 in.) end of required connection adapter. Be sure to provide a heat sink at the service valve to prevent damage during sweating operation. Connect 19-mm (3/4 in.) end of adapter to unit suction line Compatible Fitting. Connect liquid refrigerant line to unit. When a 22-mm (7/8 in.) field-supplied suction line is used, provide a field-supplied 19-mm (3/4 in.) to 22-mm (7/8 in.) suction line adapter (not necessary if 38LS accessory tubing is used).

**Mechanical Connection** — Mate one set of connections at a time.

1. Remove nut on Compatible Fitting.
2. Remove plug and be sure O-ring is in the groove inside the Compatible Fitting.
3. Cut tubing to correct length, deburr and size as necessary. Slide nut onto tube.
4. Insert tube into Compatible Fitting until it bottoms. *Tighten nut until it bottoms on shoulder of fitting or valve.* Keep tube bottomed in Compatible Fitting while tightening nut.

**NOTE:** If using Carrier accessory tubing package, make connections within 2 minutes to avoid refrigerant loss.

5. If using field-supplied tubing, evacuate or purge system using field-supplied refrigerant.

### ⚠ CAUTION

If undersized, damaged or elliptically-shaped tubing is used when making Compatible Fitting, leaks may result.

**Table 1 — Physical Data (Refer to Fig. 1)**

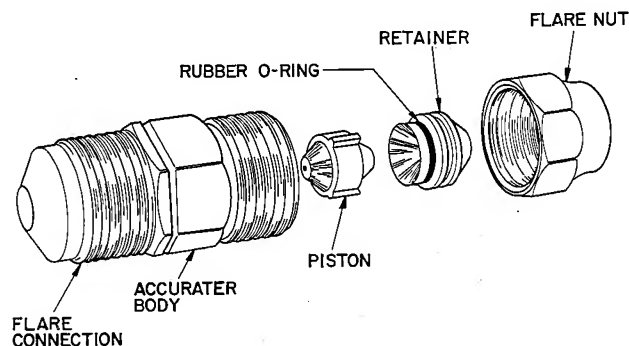
MODEL 38EC	030	036	048	060
OPER WT, Kg (lb)*	99 (218)	113 (249)	130 (286)	130 (287)
DIMEN, mm (ft-in.)				
Diameter	A 742 (2-57/32)	990 (3-3)		
Height	B 958 (3-125/32)	824 (2-87/16)	967 (3-21/16)	
CONNEC, mm (in.)†				
Suction (ODF)		19 (3/4)		
Liquid (ODF)		9.5 (3/8)		
REFRIG LINES, mm (in.)				
Suction (ODF)		29 (1 1/8)†		
Liquid (ODF)		9.5 (3/8)		

\*Weight increases slightly with addition of any accessories.

†38EC030,036,048,060 require a 29-mm (1 1/8-in.) suction line for optimum performance. A 19- x 29-mm (3/4- x 1 1/8-in.) connection adapter accessory (Carrier Part No. 28AU900061) is available. If a 22-mm (7/8-in.) accessory tubing package is used, expect a 3% capacity loss.

**Table 2 — AccuRater Chart**

MODEL 38EC	ACCURATER PISTON NO.				
	Indoor Coil Size (28--) and Indoor Fan Coil Size (40--)				
	030	036	042	048	060
030	63	63	TXV	—	—
036	—	70	70	TXV	—
048	—	—	—	82	82
060	—	—	—	—	96



**Fig. 2 — AccuRater (Bypass Type) Components**

**Sweat Connection** — Use refrigerant grade tubing.

1. Remove locking nut, plug, rubber O-ring and Schrader core and cap from valve service port.
2. Cut tubing to correct length, deburr and size as necessary.
3. Insert tube in Compatible Fitting until it bottoms.  
**NOTE:** Wrap top and bottom of service valves in wet cloth to prevent damage by heat. Solder with low-temperature 220 C (430 F) silver alloy solder.
4. Replace Schrader core and cap.
5. Evacuate or purge system using field-supplied refrigerant.

**Step 4 — Make Electrical Connections** — Be sure field wiring complies with local and national fire, safety and electrical codes, and voltage to system is within limits shown in Table 3. Contact local power company for correction of improper line voltage.

**NOTE:** Operation of unit on improper line voltage constitutes abuse and could affect Carrier warranty. *Do not* install unit in system where voltage may fluctuate above or below permissible limits.

**Table 3 — Electrical Data (50 Hz)**

MODEL 38EC	V/PH	OPER VOLTS*		COMPR		FAN FLA	MCA	MAX FUSE† OR HACR TYPE CKT BKR AMPS
		Max	Min	LRA	RLA			
030	400/3	420	380	29.0	4.00	1.6	6.6	15
036				37.3	5.00		7.85	15
048				49.0	10.4		16.2	25
060				69.0	11.4		17.8	25

**FLA** — Full Load Amps  
**HACR** — Heating, Air Conditioning, Refrigeration  
**LRA** — Locked Rotor Amps  
**MCA** — Minimum Circuit Amps  
**RLA** — Rated Load Amps

\*Permissible limits of the voltage range at which unit will operate satisfactorily.

†Time-delay fuse.

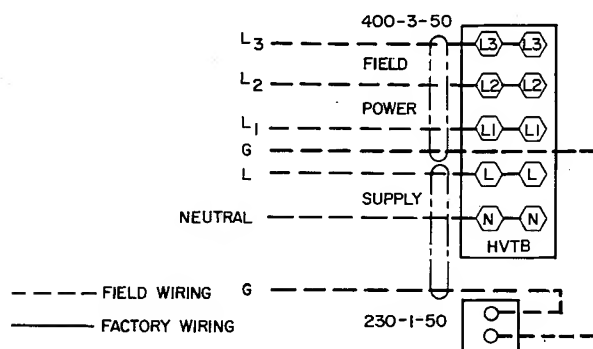
NOTE: Control circuit is 24 v on all units and requires external power source.

See Table 3 for recommended fuse sizes. When making electrical connections, provide clearance at unit for refrigerant piping connections.

**INSTALL BRANCH CIRCUIT DISCONNECT** of adequate size to handle unit starting current. Locate disconnect within sight from and readily accessible from unit.

**ROUTE LINE POWER LEADS** — Extend leads from disconnect through power wiring hole provided (see Fig. 1) and into high-voltage terminal block. Remove top cover to gain access to unit wiring.

**CONNECT GROUND LEAD AND POWER WIRING** — Connect ground lead to ground connection in control box for safety. Then connect power wiring to high-voltage terminal block. See Fig. 3. Connect unit wiring to copper power wiring only.



→ **Fig. 3 — Line Power Connections**

**CONNECT CONTROL POWER WIRING** — Route 24-v control wires through control wiring hole and connect to low-voltage terminal board (Fig. 1). Connect to C and Y on terminal board.

Use furnace or fan coil transformer as 24-v (60-v minimum) supply for system as shown in Fig. 4, or use accessory transformer.

#### ⚠ WARNING

To avoid personal injury, be sure indoor blower has stopped before attempting service or maintenance.

#### Step 5 — Start-Up

1. Energize the crankcase heater a minimum of 24 hours before starting unit. Set thermostat at OFF position and close electrical disconnect to outdoor unit.
2. Backseat (open) liquid and suction line service valves.

3. Unit is shipped with valve stem(s) frontseated, and caps installed. Replace stem caps after system is opened to refrigerant flow (backseated). Replace caps finger tight and tighten additional 1/6 turn with wrench. See sticker on valve cap.



4. Set thermostat selector switch at OFF.
5. Set room thermostat at desired temperature. Be sure set point is below indoor ambient temperature.
6. Close electrical disconnects to energize system.
7. Set room thermostat at COOL and fan switch at FAN or AUTO, as desired. Operate unit for 15 minutes. Check system refrigerant charge. See Refrigerant Charging.

Motors and controls are designed to operate satisfactorily in the voltage range shown in Table 3. If necessary to use manifold gages for servicing, refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, page 1-5, Fig. 8, for bypass method of returning charge to system. Removal of liquid line charging hose without following these precautions could result in some loss of charge.

#### Refrigerant Charging (Refer to Tables 5, 6, 7)

#### ⚠ CAUTION

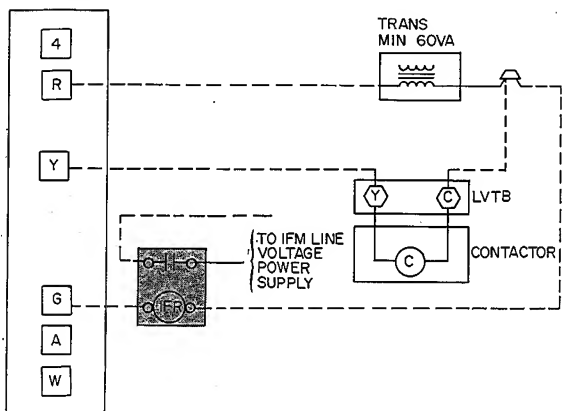
To prevent personal injury, wear safety glasses and gloves when handling refrigerant. Do not overcharge system. This can cause compressor flooding.

**Table 4 — Service Data**

MODEL 38EC	R-22 CHARGE* Kg (lb)	CONDENSER FAN RPS (RPM)	
		Hi	Low
030	3.45 (7.6)	15 (900)	12.5 (750)
036	4.99 (11.0)		
048	3.81 (8.4)		
060	4.63 (10.2)		

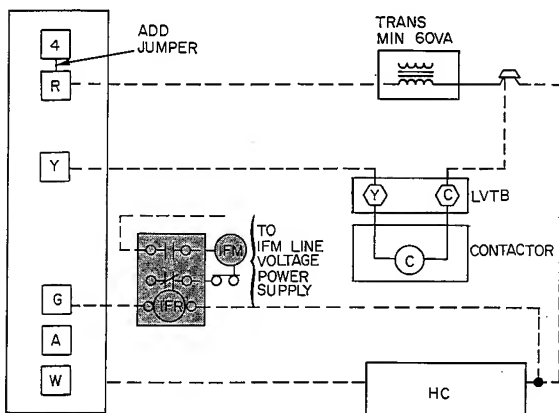
\*Factory refrigerant charge is adequate when evaporator and condensing unit are the same size and are connected with 7.6 m (25 ft) or less of field-supplied tubing of recommended size or Carrier accessory tubing.

THERMOSTAT SUBBASE  
HH93AZO42 OR  
HH93AZO40



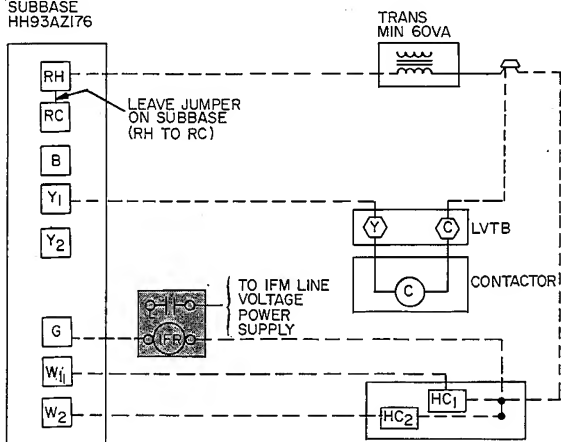
ARRANGEMENT A — COOLING ONLY

THERMOSTAT SUBBASE  
HH93AZO42 OR  
HH93AZO40



ARRANGEMENT B — ONE TRANSFORMER;  
COOLING AND ONE-STAGE HEATING

THERMOSTAT  
SUBBASE  
HH93AZI76



ARRANGEMENT C — ONE TRANSFORMER;  
COOLING AND TWO-STAGE HEATING

NOTE: Refer to unit label wiring diagram for wire colors.

IFR and IFM are located indoors on heating-cooling applications. If accessory IFR is required for cooling-only applications, locate IFR in fan coil.

C — Contactor  
HC — Heating Control  
IFM — Indoor Fan Motor  
IFR — Indoor Fan Relay  
LVTB — Low-Voltage Terminal Board  
NC — Normally Closed  
Trans — Transformer

Fig. 4 — 24-Volt Control Circuit Connections

For every 3 m (10 ft) of liquid line of recommended size over 7.6 m (25 ft), add refrigerant charge as follows: 181 g (.4 lb) for 9.5-mm (3/8-in.) line; 127 g (.28 lb) for 7.9-mm (5/16-in.) line. On all other systems, adjust charge for correct operation as applicable.

Service port connections are provided on liquid and suction line service valves for evacuation and charging. See Fig. 1.

**TO CHECK OR REPLACE REFRIGERANT CHARGE** use method recommended in Table 5. Details of charging methods are listed below.

Before recharging system, thoroughly evacuate system and then weigh in refrigerant charge specified in Table 4. Check or adjust charge as required. Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, for additional system evacuation and dehydration instructions.

**WEIGHT METHOD** — Refer to Table 4 or unit nameplate for correct system refrigerant charge. Remove any refrigerant remaining in system before recharging.

When system is not evacuated, subtract the following amount from total charge:

38EC030 — 45.3 g (.10 lb)  
38EC036 through 060 — 90.6 g (.20 lb)

The dial-a-charge charging cylinder is an accurate device used to recharge system by weight. These cylinders are available at refrigeration supply firms.

**SUPERHEAT METHOD** — Use Tables 6 and 7, and the following procedure:

1. Operate unit a minimum of 15 minutes before checking charge.
2. Measure suction pressure by attaching a gage to suction valve service port.
3. Measure suction line temperature by attaching a service thermometer to unit suction line near suction valve. Insulate thermometer for accurate readings.
4. Measure outdoor coil inlet air dry-bulb temperature with a second thermometer.
5. Measure indoor coil inlet air wet-bulb temperature with a sling psychrometer.
6. Refer to Table 6. Find air temperature entering outdoor coil and wet-bulb temperature entering indoor coil. At this intersection, note the superheat.
7. Refer to Table 7. Find superheat temperature and suction pressure, note suction line temperature.
8. If unit has higher suction line temperature than charted temperature, add refrigerant until charted temperature is reached.
9. If unit has lower suction line temperature than charted temperature, bleed refrigerant until charted temperature is reached.
10. If air temperature entering outdoor coil or pressure at suction valve changes, charge to new suction line temperature indicated on chart.
11. This procedure is valid independent of indoor air quantity.

**SIGHT GLASS METHOD** — (Field-supplied sight glass installed in liquid line.) A satisfactory operating charge can be obtained on *thermal expansion valve systems only* by charging to a clear sight glass. For optimum charge, increase high-side pressure to  $2620 \pm 69$  kPa ( $380 \pm 10$  psig) by blocking outdoor fan discharge or air entering outdoor coil. Charge to a clear sight glass while holding constant high-side pressure. For peak efficiency, adjust charge to yield a liquid refrigerant temperature at the indoor coil that is approximately the same as outdoor dry-bulb temperature.

**Table 5 — Refrigerant Charging Methods**

MODEL 38EC	METHODS OF CHECKING OR ADJUSTING CHARGE		METHODS FOR COMPLETE RECHARGING	
	System Refrigerant Control		System Refrigerant Control	
	Non-TXV	TXV	Non-TXV	TXV
ALL	Superheat Method	Sight Glass*	Weight Method plus Superheat Method	Weight Method plus Sight Glass*

\*Sight glass field supplied and installed in liquid refrigerant line.

**Table 6 — Superheat Charging Table  
(Superheat Entering Suction Service Valve)**

OUTDOOR TEMP (C)	INDOOR COIL ENTERING AIR (C) WB													
	10.0	11.1	12.2	13.3	14.4	15.6	16.7	17.8	18.9	20.0	21.1	22.2	23.3	24.4
12.8	-12.8	-11.1	-10.0	-8.3	-6.7	-5.0	-3.3	-1.7	0	1.7	2.8	4.4	5.6	7.2
15.6	-13.9	-12.2	-11.1	-9.4	-7.8	-6.1	-4.4	-2.8	-1.1	0.6	1.7	3.3	4.4	6.1
18.3	—	-14.4	-12.2	-10.6	-8.9	-7.2	-6.1	-4.4	-2.8	-1.1	0.6	2.2	3.3	5.0
21.1	—	—	-13.9	-12.2	-10.6	-8.9	-7.2	-6.1	-4.4	-2.8	-1.1	0.6	2.2	3.9
23.9	—	—	—	-14.4	-12.8	-11.1	-9.4	-7.8	-6.1	-4.4	-2.2	-0.6	1.1	2.8
26.7	—	—	—	—	-15.0	-13.3	-11.1	-9.4	-7.8	-6.1	-3.9	-2.2	-0.6	1.7
29.4	—	—	—	—	—	—	-13.3	-11.7	-9.4	-7.2	-5.6	-3.3	-1.1	0.6
32.2	—	—	—	—	—	—	-15.0	-12.8	-10.6	-8.9	-6.7	-4.4	-2.8	-0.6
35.0	—	—	—	—	—	—	—	-14.4	-12.2	-10.0	-7.8	-5.6	-3.9	-1.7
37.8	—	—	—	—	—	—	—	—	-13.3	-11.1	-9.4	-6.7	-5.0	-2.8
40.6	—	—	—	—	—	—	—	—	-15.0	-12.8	-10.6	-8.3	-5.6	-3.3
43.3	—	—	—	—	—	—	—	—	—	-14.4	-11.7	-9.4	-6.7	-3.9
46.1	—	—	—	—	—	—	—	—	—	—	-13.3	-10.0	-7.8	-5.0

OUTDOOR TEMP (F)	INDOOR COIL ENTERING AIR (F) WB													
	50	52	54	56	58	60	62	64	66	68	70	72	74	76
55	9	12	14	17	20	23	26	29	32	35	37	40	42	45
60	7	10	12	15	18	21	24	27	30	33	35	38	40	43
65	—	6	10	13	16	19	21	24	27	30	33	36	38	41
70	—	—	7	10	13	16	19	21	24	27	30	33	36	39
75	—	—	—	6	9	12	15	18	21	24	28	31	34	37
80	—	—	—	—	5	8	12	15	18	21	25	28	31	35
85	—	—	—	—	—	—	8	11	15	19	22	26	30	33
90	—	—	—	—	—	—	5	9	13	16	20	24	27	31
95	—	—	—	—	—	—	—	6	10	14	18	22	25	29
100	—	—	—	—	—	—	—	—	8	12	15	20	23	27
105	—	—	—	—	—	—	—	—	5	9	13	17	22	26
110	—	—	—	—	—	—	—	—	—	6	11	15	20	25
115	—	—	—	—	—	—	—	—	—	—	8	14	18	23

— Do not attempt to charge system under these conditions or refrigerant slugging may occur.

**Table 7 — Required Suction-Tube Temperature  
(Entering Suction Service Valve)**

SUPERHEAT TEMP (C)	SUCTION PRESSURE AT SERVICE PORT (kPa)								
	424	443	463	483	503	524	546	568	591
-17.8	1.7	2.8	3.9	5.0	6.1	7.2	8.3	9.4	10.6
-16.7	2.8	3.9	5.0	6.1	7.2	8.3	9.4	10.6	11.7
-15.6	3.9	5.0	6.1	7.2	8.3	9.4	10.6	11.7	12.8
-14.4	5.0	6.1	7.2	8.3	9.4	10.6	11.7	12.8	13.9
-13.3	6.1	7.2	8.3	9.4	10.6	11.7	12.8	13.9	15.0
-12.2	7.2	8.3	9.4	10.6	11.7	12.8	13.9	15.0	16.1
-11.1	8.3	9.4	10.6	11.7	12.8	13.9	15.0	16.1	17.2
-10.0	9.4	10.6	11.7	12.8	13.9	15.0	16.1	17.2	18.3
-8.9	10.6	11.7	12.8	13.9	15.0	16.1	17.2	18.3	19.4
-7.8	11.7	12.8	13.9	15.0	16.1	17.2	18.3	19.4	20.6
-6.7	12.8	13.9	15.0	16.1	17.2	18.3	19.4	20.6	21.7
-5.6	13.9	15.0	16.1	17.2	18.3	19.4	20.6	21.7	22.8
-4.4	15.0	16.1	17.2	18.3	19.4	20.6	21.7	22.8	23.9
-3.3	16.1	17.2	18.3	19.4	20.6	21.7	22.8	23.9	25.0
-2.2	17.2	18.3	19.4	20.6	21.7	22.8	23.9	25.0	26.1
-1.1	18.3	19.4	20.6	21.7	22.8	23.9	25.0	26.1	27.2
0.0	19.4	20.6	21.7	22.8	23.9	25.0	26.1	27.2	28.3
1.1	20.6	21.7	22.8	23.9	25.0	26.1	27.2	28.3	29.4
2.2	21.7	22.8	23.9	25.0	26.1	27.2	28.3	29.4	30.6
3.3	22.8	23.9	25.0	26.1	27.2	28.3	29.4	30.6	31.7
4.4	23.9	25.0	26.1	27.2	28.3	29.4	30.6	31.8	32.8

SUPERHEAT TEMP (F)	SUCTION PRESSURE AT SERVICE PORT (psig)								
	61.5	64.2	67.1	70.0	73.0	76.0	79.2	82.4	85.7
0	35	37	39	41	43	45	47	49	51
2	37	39	41	43	45	47	49	51	53
4	39	41	43	45	47	49	51	53	55
6	41	43	45	47	49	51	53	55	57
8	43	45	47	49	51	53	55	57	59
10	45	47	49	51	53	55	57	59	61
12	47	49	51	53	55	57	59	61	63
14	49	51	53	55	57	59	61	63	65
16	51	53	55	57	59	61	63	65	67
18	53	55	57	59	61	63	65	67	69
20	55	57	59	61	63	65	67	69	71
22	57	59	61	63	65	67	69	71	73
24	59	61	63	65	67	69	71	73	75
26	61	63	65	67	69	71	73	75	77
28	63	65	67	69	71	73	75	77	79
30	65	67	69	71	73	75	77	79	81
32	67	69	71	73	75	77	79	81	83
34	69	71	73	75	77	79	81	83	85
36	71	73	75	77	79	81	83	85	87
38	73	75	77	79	81	83	85	87	89
40	75	77	79	81	83	85	87	89	91

## SERVICE

NOTE: To avoid possible damage and injury, Carrier recommends that periodic service, repair and maintenance be done by qualified Carrier maintenance personnel.

### ⚠ CAUTION

Unit has high-pressure piping which may also be hot to touch, energized electrical components and a rotating fan. Before servicing or checking unit, be sure *all* system power is off and tubing is cool.

**Compressor Removal** — See Table 8 for compressor information and Fig. 5 for component location. Shut off power to unit. Remove refrigerant from unit

using refrigerant removal methods described in Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants. Be sure system pressure is 0 kPa (0 psig) before attempting compressor removal.

**Table 8 — Compressor Data**

MODEL 38EC	PRODUCTION COMPRESSOR*	OIL CHARGE, Kg (oz)†	
		Initial	Recharge
030	AV5532E	1.5 (54)	1.4 (51)
036	AV5538E	1.5 (54)	1.4 (51)
048	PH6016BF	2.2 (76)	1.8 (64)
060	PH7716AF	2.2 (76)	1.8 (64)

\*Refer to Carrier Service Parts Catalog for replacement model numbers.

†Where piping exceeds 15 m (50 ft), contact Carrier distributor.

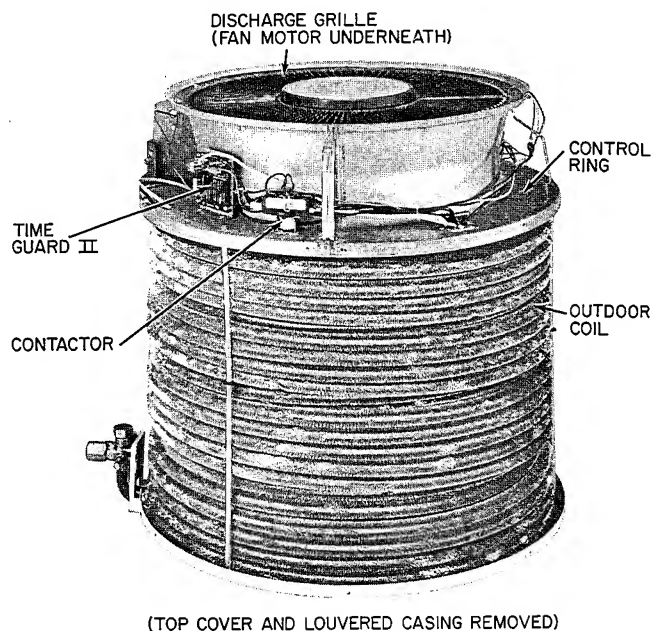
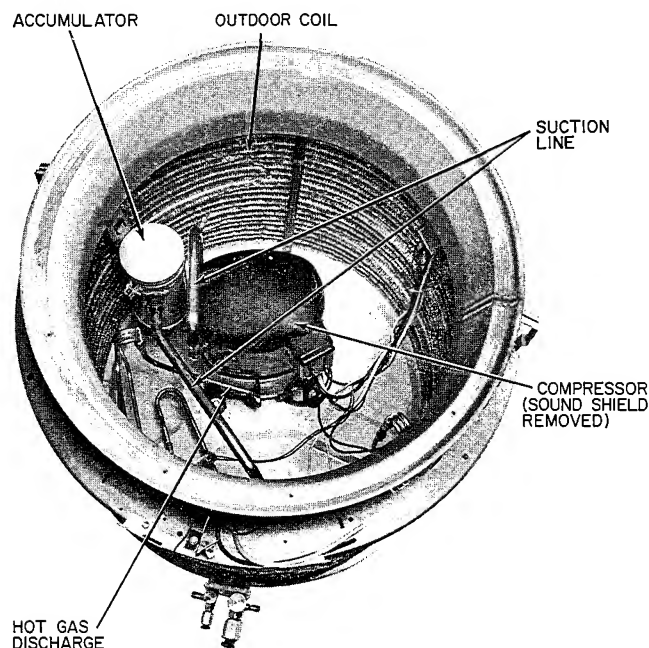


Fig. 5 — 38EC Component Locations

### ⚠ CAUTION

Aluminum tubing is used in unit coils. Do not over-heat or place excessive strain on tubing or damage may result.

1. Remove top cover by loosening screws around unit and screws in connector plate. Lift cover straight up.
2. Disconnect high- and low-voltage field wiring and fan motor leads from capacitor and fan terminal block.
3. Remove screws holding discharge grille in place. Lift grille from unit.
4. Disconnect compressor leads (crankcase heater, low-pressure switch, if so equipped) from electrical components and pull them through wire access opening into coil section. Lift fan orifice/control ring after pinching and pressing down on 3 plastic pins of tube supports.
5. Remove louvered casing by taking out screws securing it to cabinet and sliding it away from coil.
6. Using a midget tubing cutter, cut liquid and discharge lines on coil and suction line at a convenient place for easy reassembly with copper slip couplings.

### ⚠ CAUTION

Excessive movement of copper lines at compressor may cause a break where lines connect to condenser coil.

7. After plugging connections, remove outdoor coil by pinching plastic pins of tube supports that extend into basepan and lift vertically. Set coil on a clean, flat surface.
8. Remove compressor holddown bolts and slide out compressor. Remove crankcase heater, if so equipped.

### ⚠ WARNING

For brazing and unbrazing, have fire extinguisher and/or quenching cloth available in case oil vapor ignites.

9. Carefully unbrazed suction and discharge line piping stubs from compressor after noting position of stubs to assist when reinstalling.
10. Install new compressor, placing crankcase heater around compressor, if so equipped. Be sure compressor holddown bolts are in place.
11. Replace coil; braze suction and discharge lines to compressor piping stubs (at points where cut, step 6); rewire compressor and leak test.
12. Replace fan orifice/control ring; connect compressor wires after feeding them through control ring; replace fan/grille assembly and rewire; connect high- and low-voltage power wiring; and replace louvered casing.
13. Replace top cover by running screws into orifice loosely and tighten when cover is in place.
14. Evacuate and recharge system.

**Filter Drier** — Install field-supplied filter drier (Table 9) in system liquid line when refrigerant system is opened for service as described under Compressor Removal. Position drier in liquid line at convenient location.

**Pumpdown Procedure** — System may be pumped down in order to make repairs on low side without losing complete refrigerant charge.

1. Attach pressure gage to suction service valve gage port.
2. Frontseat liquid line valve.
3. Start unit. Run until suction pressure reaches 35 kPa (5 psig) (see Caution).
4. Shut unit off. Frontseat suction valve.
5. Vent remaining pressure to atmosphere.

### ⚠ CAUTION

Outdoor coil holds only factory-supplied amount of refrigerant. Excess refrigerant may cause unit to shut off on high-pressure switch cutout (if unit is so equipped) during pumpdown. This is indicated by a high discharge pressure or a sudden rise of suction pressure before suction pressure reaches 35 kPa (5 psig). If this occurs, shut unit off immediately and frontseat suction valve. Transfer remaining refrigerant into suitable container.



## Unit Controls and Safety Devices

**HIGH-PRESSURE RELIEF VALVE** is located in compressor. Relief valve opens if system operating pressure differential between suction and discharge pressure reaches  $3103 \pm 345$  kPa ( $450 \pm 50$  psi) on all models.

**LOW-PRESSURE SWITCH** is located on unit suction line. Low-pressure switch settings are: cutout,  $214 \pm 28$  kPa ( $31 \pm 4$  psig); cut-in,  $414 (+103, -0)$  kPa ( $60 [+15, -0]$  psig).

**COMPRESSOR INTERNAL TEMPERATURE AND/OR CURRENT SENSITIVE OVERLOADS** reset automatically when motor internal temperatures drop to a safe level (overload may require up to 30 minutes to reset). When internal overload is suspected of being open, check by using an ohmmeter or continuity tester. If necessary, refer to Carrier Standard Service Techniques Manual, Chapter 2, Electrical, for complete instructions.

**INHERENT FAN MOTOR PROTECTION** protects motor from abnormal current and temperature.

**SOLID-STATE TIME GUARD II CIRCUIT**, protects unit compressor by preventing short cycling. Time Guard II circuit provides a  $5 \pm 2$ -minute delay before restarting compressor after shutdown for any reason. On normal start-up, the 5-minute delay occurs before thermostat closes. After thermostat closes, the Time Guard II circuit then provides a 3-second delay to prevent contactor chattering.

**CRANKCASE HEATER** keeps the crankcase warm during the off cycle and prevents dilution of oil with refrigerant. This assures good lubrication and prevents loss of oil from crankcase during start-up.

## Compatible Fitting Repair

**MECHANICAL CONNECTION** — Frontseat unit service valves. Relieve refrigerant pressure from tubing. Back off locknut from Compatible Fitting onto tube. Cut fitting between threads and O-ring. See Fig. 6. Remove tubing section remaining in threaded portion of fitting. Discard locknut.

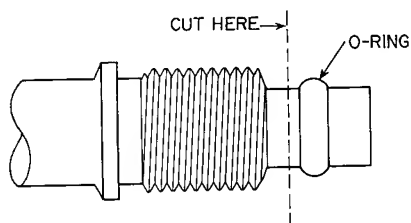


Fig. 6 — Repair of Mechanical Connection

Clean, flux and insert new tube end into remaining portion of Compatible Fitting. *Wrap valve in wet rag to prevent damaging factory-made joints.* Heat and apply low-temperature 220 C (430 F) solder.

**SWEAT CONNECTION** — Frontseat unit service valve. Relieve refrigerant pressure from tubing. Clean and flux area around leak. Repair using low-temperature 220 C (430 F) solder.

Evacuate or purge evaporator coil and tubing system. Add refrigerant charge. See Refrigerant Charging.

**Outdoor Fan Adjustment** — Required fan position is shown in Fig. 7. Adjust fan by loosening setscrew(s) and moving fan blade up or down.

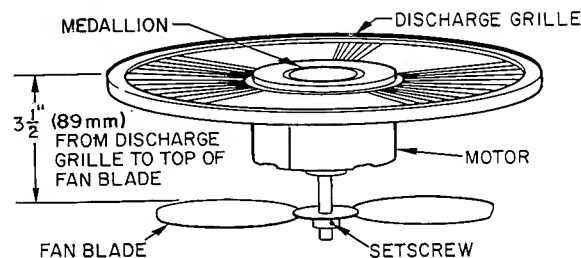


Fig. 7 — Outdoor Fan Position

## Outdoor Fan Motor Removal

1. Shut off power to unit to avoid possible electric shock or injury from rotating fan blade.
2. Remove top cover by loosening screws and lifting straight up.
3. Disconnect fan motor leads from control leads. See Fig. 5.
4. Remove Carrier medallion by turning 4 Tinnerman fasteners  $1/4$  turn each.
5. Remove screws holding fan motor/discharge grille in place and lift assembly from unit.
6. Remove 4 nuts holding fan motor to discharge grille. Remove motor and leads.
7. Reassembly is reverse of above procedure. Make sure fan is positioned correctly as in Fig. 7.

## MAINTENANCE

### ⚠ CAUTION

Before performing maintenance, be sure unit main power is turned off. Failure to do so may result in electric shock or injury from rotating fan blade.

## Lubrication

**COMPRESSOR** contains factory oil charge. Replace oil when lost. See Table 8 for oil recharge and refer to Carrier Standard Service Techniques Manual, Chapter 1, page 1-21, for oil recharging procedure. Use Carrier PP33-2, Texaco WF-32 or Suniso 3GS oil.

**FAN MOTOR BEARINGS** — Oiling holes are provided at each end of condenser fan motor. Remove fan motor and lubricate motor with 32 drops (16 drops per hole) of SAE 10 nondetergent oil at intervals described below.

- a. Annually, when environment is very dirty, ambient temperature is higher than 40.6 C (105 F) and average unit operating time exceeds 15 hours a day.
- b. Every 3 years when environment is reasonably clean, ambient temperature is less than 40.6 C (105 F) and unit operating time averages 8 to 15 hours a day.
- c. Every 5 years when environment is clean, ambient temperature is less than 40.6 C (105 F) and unit operating time averages less than 8 hours a day.

**Coil Repair** — A flare-union coupling repair kit is available, with instructions, from Carrier Service Parts.

**Coil Cleaning** should be done at the beginning of each cooling season or more often if required.

### ⚠ CAUTION

Fin damage can result in higher operating costs or compressor damage. Do not use flame, high-pressure water, steam or volatile or corrosive cleaners on fins and tubing. Follow these instructions carefully. Contact your dealer if you encounter problems.



1. Shut off power to unit.
2. Remove louvered casing by taking out screws securing it to the cabinet and sliding it away from the coil.
3. Clean coil using vacuum cleaner and its crevice tool (see Fig. 8). Work crevice tool *vertically* making sure tool only touches dirt on fins. To prevent fin damage, do not scrub fins with tool or move tool against fins horizontally.
4. If oil deposits are present, spray coil with ordinary household detergent. Wait 10 minutes. Proceed to step 5.
5. Using garden hose, spray coil vertically downward with a constant stream of water at moderate pressure (see Fig. 8). Keep nozzle at a 15 to 20 degree angle, about 76 mm (3 in.) from coil face and 457 mm (18 in.) from tube. Spray so debris is washed out of coil.
6. Reinstall louvered casing being careful not to damage coil.
7. Restore power to unit.

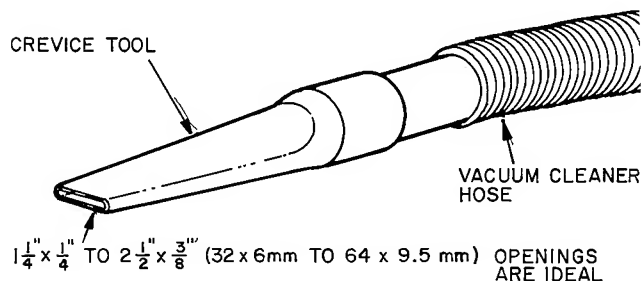


Fig. 8 — Crevice Cleaning Tool

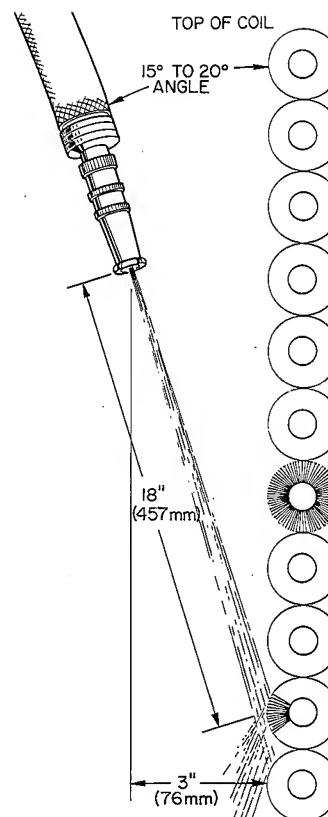


Fig. 9 — Positioning Hose to Spray Coil

Table 9 — Accessories

PART NO.	DESCRIPTION						MODEL 38EC
HH01AD040	Low-Voltage Control — Honeywell Deluxe Thermostat Thermostat Subbase						All
HH93AZ040							
HH51AR001	Comfort Control Center (Use with HH01AD040)						
HH07AT170	Low-Voltage Control — Honeywell Thermostat						
HH07AT174							
HH93AZ176	Thermostat Subbase (with Automatic Changeover)						
HH01AD042	Low-Voltage Control — Honeywell Thermostat						
HH93AZ042	Thermostat Subbase						
38VH90000106	Thermocharger Replacement Unit Module (Six 38VH900001)						
38GS900102	Indoor Fan Relay (Six HN61KJ210)						
HT01AW230	Low-Voltage Transformer (60 va) — Available through Carrier Service Parts						
09WQ036,060	Refrigerant-to-water heat exchanger for chilled water systems						
38RQ90008106	Liquid Line Filter Drier (Six KH45LD077)						
28AU90006112	Twelve 19- x 29-mm (¾- x 1 ½-in.) suction connection adapters						048,060
TUBING PACKAGES	TUBING*						MODEL 38EC
	Length m-ft	Liquid		Suction†			
		OD mm-in.	Tube End OD mm-in.	OD mm-in.	Tube End OD mm-in.		
					Evap	Cond	
38LS934151	4.6-15	9.5-¾	9.5-¾	19-¾	19-¾	19-¾	030
38LS934201	6.1-20						
38LS934251	7.6-25						
38LS934301	9.1-30						
38LS934351	10.7-35						
38LS934401	12.2-40						
38LS934501	15.2-50						
38LS978151	4.6-15	9.5-¾	9.5-¾	22-7⁄8	19-¾	19-¾	036 048,060 (See Note 2)
38LS978201	6.1-20						
38LS978251	7.6-25						
38LS978301	9.1-30						
38LS978351	10.7-35						
38LS978401	12.2-40						
38LS978501	15.2-50						

\*For maximum capacities, use suction line sizes recommended in Table 1. Use of accessory tubing packages smaller than recommended may result in slight capacity loss.

†Suction line is insulated and has a 90 degree bend at one end.

NOTES: 1. Do not cut 9.5-mm (3/8-in.) OD liquid line to a length shorter than 3 m (10 ft). Do not cut 22-mm (7/8-in.) OD suction lines.  
2. Field-supplied 29-mm (1 1/8-in.) suction line is recommended on 38EC030,036,048 and 060.

## TROUBLESHOOTING GUIDE

SYMPTOM AND PROBABLE CAUSE	PROBABLE REMEDY
<p><b>COMPRESSOR SHUTS OFF, FAN OVERLOAD OR HIGH-PRESSURE SWITCH CUT OUT, OR INTERNAL PRESSURE RELIEF OPENS</b></p> <p><b>Outdoor Fan On</b></p> <ol style="list-style-type: none"> <li>1. Outdoor air restricted or recirculating.</li> <li>2. Refrigerant overcharge; noncondensables in system; system restricted.</li> <li>3. Improper line voltage, loose electrical connections, faulty run capacitor.</li> </ol> <p><b>Outdoor Fan Off</b></p> <ol style="list-style-type: none"> <li>1. Fan slipping on shaft, fan motor bearing stuck, fan motor defective.</li> <li>2. Loose electrical connections. Fan motor overload open.</li> </ol>	<ol style="list-style-type: none"> <li>1. Outdoor coil blocked. See Maintenance, Coil Cleaning. Check airflow clearance (Fig. 1).</li> <li>2. Review Refrigerant Charging procedures; purge system, replace filter drier, check refrigerant control.</li> <li>3. Review Installation, Step 4; replace capacitor.</li> </ol> <ol style="list-style-type: none"> <li>1. Tighten fan hub setscrews, see Outdoor Fan Motor Removal.</li> <li>2. Check unit wiring. Check motor bearings. Replace motor.</li> </ol>
<p><b>COMPRESSOR RUNS BUT COOLING IS INSUFFICIENT</b></p> <ol style="list-style-type: none"> <li>1. Low refrigerant charge.</li> <li>2. Dirty filters, partially restrict airflow (indoor coil may have partial frost condition).</li> </ol> <p><b>High Suction Pressure</b></p> <ol style="list-style-type: none"> <li>1. Defective compressor valves (accompanied by low head pressure).</li> </ol>	<ol style="list-style-type: none"> <li>1. Check Refrigerant Charging procedures.</li> <li>2. Check indoor air system for dirty filters, obstruction in ductwork, improper damper settings. Refer to coil, fan coil or furnace instructions as applicable.</li> </ol> <ol style="list-style-type: none"> <li>1. Perform Compressor Removal procedure. Recheck system charge.</li> </ol>
<p><b>COMPRESSOR SHUTS OFF FROM LOW-PRESSURE SWITCH CUTOUT</b></p> <p><b>Indoor Fan Runs</b></p> <ol style="list-style-type: none"> <li>1. Low refrigerant charge or restricted indoor air.</li> <li>2. Restricted refrigerant flow.</li> </ol> <p><b>Indoor Fan Stopped</b></p> <ol style="list-style-type: none"> <li>1. Indoor fan motor defective or inoperative.</li> </ol>	<ol style="list-style-type: none"> <li>1. See Compressor Runs But Cooling is Insufficient above regarding filters, ductwork, etc.</li> <li>2. Check refrigerant flow device, be sure correct AccuRater or TXV is used.</li> </ol> <ol style="list-style-type: none"> <li>1. Check furnace or fan instructions regarding defective fan relay, belt adjustment, condition of motor bearings and overloads, check and tighten electrical connections, check power supply.</li> </ol>
<p><b>COMPRESSOR SHUTS OFF, WILL NOT RESTART</b></p> <p><b>Contactor Open</b></p> <ol style="list-style-type: none"> <li>1. Burned out transformer, open thermostat circuit, faulty control relay, open overload.</li> </ol> <p><b>Contactor Closed or Closes Then Opens</b></p> <ol style="list-style-type: none"> <li>1. Compressor power is out, compressor motor is burned out or internal overloads are open. Time Guard II circuit faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check control circuit components and wiring. Refer to unit label diagram, check all conditions. Refer to Standard Service Techniques Manual, Chapter 2, Electrical.</li> </ol> <ol style="list-style-type: none"> <li>1. Check main power supply wiring. Refer to Electrical Data table and label diagram. Substitute Time Guard II with a replacement to verify its operation. Refer to Standard Service Techniques Manual, Chapter 2, Electrical.</li> </ol>